REMARKS

Reconsideration and allowance of the subject application are respectfully requested. By this Amendment, Applicant has canceled claim 2 without prejudice or disclaimer. Thus, claims 1, 3 and 4 are now pending in the application. In response to the Office Action (Paper No. 4), Applicant respectfully submits that the pending claims define patentable subject matter.

I. The Present Invention

The present invention is directed to a surface treatment method and an electrode for the surface treatment method. As shown in Figure 1, a workpiece 100 is disposed on a work stand 2 which is provided inside a working bath 1 filled with a working liquid. A discharge electrode 3 is coupled to a power source 4 for applying a discharge voltage between the discharge electrode 3 and the workpiece 100 under the control of a control circuit 6.

The discharge electrode 3 comprises a material having solid lubricant effect, such as molybdenum. Discharge in a pulse form is generated between the discharge electrode 3 and the surface to be treated of the workpiece 100. The working liquid is a liquid, such as tap water, treated water or pure water, which does not include carbon components.

In operation, material consumed or melted from the discharge electrode 3, generated by the electric discharge energy based on the pulse form discharge, adheres to and is deposited onto the surface of the workpiece 100 thereby forming a coat having a lubricant effect on the surface of the workpiece 100. Since water is used as the working liquid, the electrode material having solid lubricant effect adheres and deposits onto the surface to be treated, without conversion of

the electrode material to a compound with carbon. As a result, a lubricant coat (solid lubricant film) can be formed on the surface to be treated.

II. Rejection of claims 1-4 under 35 U.S.C. § 112, second paragraph, as being indefinite

With regards to claims 2 and 4, the Examiner maintains that the trademark/tradename "turcite" is indefinite. By this Amendment, Applicant has amended the claims to replace "turcite" with "a compound of carbon and fluorine".

With regards to claim 1, the Examiner maintains that "an electric discharge" should be "the electric discharge" since the limitation is introduced in line 1. Further, the Examiner maintains that the alternative language in the last line of claim 4 is confusing and unclear. By this Amendment, Applicant has amended claims 1 and 4 to improve clarity.

With regards to claims 1 and 4, the Examiner contends that the phrase "a working liquid containing no carbon components" is indefinite because the Examiner maintains that it is unclear whether this means no elemental carbon or no carbon in compounds, such as liquids like kerosene. However, Applicant submits that the phrase "a working liquid containing no carbon components" is both definite and entirely proper under 35 U.S.C. § 112, since those of ordinary skill in the art can easily ascertain the metes and bounds of the present invention from the claims. That is, one of ordinary skill in the art would ascertain that the phrase "a working liquid containing no carbon components" means a working liquid which does not include carbon in either elemental or compound form.

Accordingly, the Examiner is requested to remove the § 112, second paragraph, rejection of record.

III. Prior Art Rejections

Claim 4 is rejected under 35 U.S.C. § 102(b) as being anticipated by JP 9-19829, JP 54-104095, JP- 56-15938, JP 51-97099, or JP 55-48538. Claims 1-3 are rejected under 35 U.S.C. § 103(a) as being unpatentable over JP 5-148615 in view of JP 6-182626 and JP 54-104095, JP 51-97099, JP 55-48538, or JP- 56-15938. Applicant respectfully submits that the claimed invention would not have been anticipated by or rendered obvious in view of the cited references.

With regards to independent claim 1, the Examiner asserts that JP 6-182626 discloses a surface treatment method for generating an electric discharge between an electrode and a workpiece disposed in water. Further, the Examiner contends that while the abstract of JP 6-182626 does not indicate that the electric discharge is in a pulse form, JP 5-148615 discloses "pulse electric discharge machining".

With regards to independent claim 4, the Examiner maintains JP 9-19829, JP 54-104095, JP- 56-15938, JP 51-97099, and JP 55-48538 each disclose electrodes for discharge surface treatment which are formed of by one or more of the claimed materials including molybdenum, silver, carbon (graphite), tin and tungsten.

Amended claim 1 recites "generating an electric discharge, in a pulse form, between an electrode and a workpiece in a working liquid containing no carbon components, the electrode being formed with a material having a solid lubricant effect ... wherein the material having solid

lubricant effect comprises at least one of molybdenum disulfide, boron nitride, tungsten disulfide, gold, lead, indium, and a compound of carbon and fluorine." Similarly, amended independent claim 4 recites "the electrode compris[es] a powder compressed electrode obtained by compression-molding powder of at least one of molybdenum disulfide, boron nitride, tungsten disulfide, gold, lead, indium, and a compound of carbon and fluorine."

Although the cited references appear to disclose electrodes made of molybdenum, silver, carbon (graphite), tin and nickel. Applicant submits that the none of the cited references disclose that an electrode for discharge surface treatment formed of at least one of molybdenum disulfide, boron nitride, tungsten disulfide, gold, lead, indium, and a compound of carbon and fluorine, as claimed. Further, the cited references do not teach that the deposited layer has a lubricant effect.

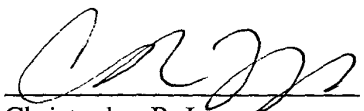
Accordingly, Applicant respectfully submits that claims 1, 3 and 4 should be allowable because the cited references, alone or combined, do not teach or suggest all of the features of the claims.

IV. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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Date: February 7, 2003

APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Claim 2 is canceled.

The claims are amended as follows:

1. (Amended) A discharge surface treatment method [using electric discharge], the method comprising the steps of:

generating an electric discharge, in a pulse form, between an electrode [(3)] and a workpiece [(100)] in a working liquid containing no carbon components, the electrode [(3)] being formed with a material having a solid lubricant effect; and

adhering and depositing the material of the electrode [(3)] consumed or melted due to the generated electric discharge onto a surface of the workpiece [(100)] thereby forming a coat having lubricant effect on the surface of the workpiece [(100)],

wherein the material having solid lubricant effect comprises at least one of molybdenum disulfide, boron nitride, tungsten disulfide, gold, lead, indium, and a compound of carbon and fluorine.

4. (Twice Amended) [An] In combination, an electrode [(3),] for discharge [surfaced] surface treatment and a working liquid; said electrode[, used for] carrying out a surface treatment [method] using electric discharge in [a] said working liquid, said working liquid containing no carbon components, [wherein] and the electrode [(3) being] comprising a powder compressed

electrode obtained by compression-molding powder of [molybdenum,] at least one of molybdenum disulfide, boron nitride, tungsten disulfide, [carbon, silver,] gold, lead, [tin,] indium, [nickel, or turcite, which is] and a compound of carbon and fluorine[, or a metal electrode comprising one or more of these components].